

Serial No. 09/898,040
Amdt. dated June 22, 2005
Reply to Office Action of January 5, 2005

Docket No. K-0280

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-42 (Cancelled)

43. (Currently Amended) A method of rate adaptation in a communication apparatus, comprising:

providing information ~~bit~~ bits of a prescribed data rate to an input of an encoder, the encoder having a prescribed code rate;

adapting the prescribed code rate of the encoder and providing coded bits, based on an adapted code rate, to an output of the encoder, the prescribed code rate being adapted to the adapted code rate for providing a ~~increase~~ coding gain; and

performing ~~one of repetition and or~~ puncturing of the coded bits by a rate matching device, the output of the encoder being coupled to an input of the rate matching device ~~for rate matching; and~~

interleaving the result of the repetition or puncturing which is provided from an output of the rate matching device to an input of an interleaver.

44. (Previously Presented) The method of claim 43, when the prescribed data rate of the information bits changes, the code rate of the encoder is adapted.

45. (Currently Amended) The method of claim 43, wherein the adapted ~~prescribed~~ code rate of the encoder is one of $1/2$, $1/3$, $1/4$, and $1/5$.

46. (Previously Presented) The method of claim ~~45~~43, wherein 'N' is a size of an interleaver, 'T' is a number of information bits per frame, and the prescribed code rate of the encoder is adapted to $1/3$ when a prescribed ratio $<N/I \leq 3$, $1/4$ when $3 < N/I \leq 4$, and $1/5$ when $N/I > 4$.

47. (Previously Presented) The method of claim 43, wherein the encoder is a turbo encoder with a maximum code rate of $1/5$.

Claim 48 (Cancelled).

49. (Previously Presented) The method of claim 43, wherein symbol puncturing is enabled for symbol groups having indices $2j$ and $2j+1$ if $(j \bullet k) \bmod J < K$, wherein 'T' is a number of information bits per frame, 'J' equals $\lfloor I/2 \rfloor$, 'N' is a size of the interleaver, 'K' equals $\lfloor (L-N)/2 \rfloor$,

and 'L' is a number of coded bits, and wherein each of the symbol groups comprises L/I coded bits.

50. (Currently Amended) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for ~~a~~ the adapted code rate of 1/3 turbo code rate when ~~2I~~ a prescribed ratio $< N \leq 3I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index of the symbol groups and ranges from 0 to I-1, and wherein the pattern to puncture symbol groups corresponding to coded bits of data bits is '110' for P_0 and '101' for P_1 , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

51. (Previously Presented) The method of claim 50, wherein the information bits further includes tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '101' for P_0 and '101' for P_1 .

52. (Currently Amended) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for ~~a~~ the adapted code rate of 1/4 turbo code rate when $3I < N \leq 4I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index of the symbol groups and ranges from 0 to I-1, and wherein the pattern to puncture symbol groups corresponding to

coded bits of data bits is '1011' for P_0 and '1110' for P_1 , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

53. (Previously Presented) The method of claim 52, wherein the information bits further include tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '1011' for P_0 and '1011' for P_1 .

54. (Currently Amended) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for ~~a~~ the adapted code rate of 1/5 turbo code rate when $4I < N \leq 5I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index of the symbol groups and ranges from 0 to I-1, and wherein the pattern to puncture symbol groups corresponding to coded bits of data bits is '11101' for P_0 and '11011' for P_1 , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

55. (Previously Presented) The method of claim 54, wherein the information bits further include tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '11011' for P_0 and '11011' for P_1 .

56. (Currently Amended) A communication device having a rate adaptation mode, comprising:

an encoder for receiving information bits at a prescribed data rate and having a prescribed code rate for providing coded bits, wherein when the prescribed data rate changes, the prescribed code rate of the encoder is adapted to an adapted code rate for providing to increase coding gain, and the encoder providing coded bits based on the adapted code rate;

a rate matching device for receiving the coded bits based on the adapted code rate from the encoder, and repeating which repeats or punctures puncturing a prescribed number of coded bits; and

an interleaver for receiving an output of the rate matching device.

Claim 57 (Cancelled).

58. (Previously Presented) The device of claim 56, wherein the prescribed rate of the encoder is adapted to be one of $1/3$, $1/4$, and $1/5$.

59. (Previously Presented) The device of claim 56 or 58, wherein 'N' is a size of the interleaver, 'I' is a number of information bits per frame, and the prescribed code rate of the encoder is adapted to $1/3$ when a prescribed ratio $N/I \leq 3$, $1/4$ when $3 < N/I \leq 4$, and $1/5$ when $N/I > 4$.

60. (Previously Presented) The device of claim 56, wherein the encoder is a turbo encoder with a maximum code rate of $1/5$.

Claims 61-82 (Cancelled).

83. (Previously Presented) The method of claim 46, wherein the prescribed ratio is $8/3$.

84. (Previously Presented) The method of claim 43, wherein the method is implemented during variable data rate mode and/or flexible data rate mode.

85. (Currently Amended) The method of claim 43, wherein the method is used for radio configuration (RC)4 of a physical channel ~~for the forward link~~.

86. (Previously Presented) The device of claim 56, wherein the method is implemented during flexible data rate mode and/or variable data rate mode.

87. (Previously Presented) The device of claim 59, wherein the prescribed ratio is $8/3$.

88. (Currently Amended) The method of claim 56, wherein the adapted ~~prescribed~~ code rate of the encoder is one of $1/2$, $1/3$, $1/4$, and $1/5$.

89. (Previously Presented) The method of claim 88, wherein 'N' is a size of an interleaver, 'I' is a number of information bits per frame, and the prescribed code rate of the encoder is adapted to $1/3$ when a prescribed ratio $< N/I \leq 3$, $1/4$ when $3 < N/I \leq 4$, and $1/5$ when $N/I > 4$.

90. (Previously Presented) The method of claim 56, wherein the encoder is a turbo encoder with a maximum code rate of $1/5$.

91. (Previously Presented) The method of claim 56, wherein coded bit puncturing is enabled for coded bit groups having indices $2j$ and $2j+1$ if $(j \bullet k) \bmod J < K$, wherein 'I' is a number of information bits per frame, 'J' equals $\lfloor I/2 \rfloor$, 'N' is a size of the interleaver, 'K' equals $\lfloor (L-N)/2 \rfloor$, and 'L' is a number of coded bits, and wherein each of the coded bit groups comprises L/I coded bits.

92. (Currently Amended) The method of claim 91, wherein the information bits include data bits and a pattern used to puncture the coded bit group 'i' for ~~a~~ the adapted code rate of $1/3$ turbo code rate when ~~2I~~ a prescribed ratio $< N \leq 3I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index

of the coded bit groups and ranges from 0 to $I-1$, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data bits is '110' for P_0 and '101' for P_1 , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit group 'i'.

93. (Previously Presented) The method of claim 92, wherein the information bits further include tail bits, and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '101' for P_0 and '101' for P_1 .

94. (Currently Amended) The method of claim 91, wherein the information bits include data bits, and a pattern used to puncture the coded bit group 'i' for ~~a~~the adapted code rate of 1/4 turbo code rate when $3I < N \leq 4I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index of the coded bit groups and ranges from 0 to $I-1$, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data bits is '1011' for P_0 and '1110' for P_1 , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit group 'i'.

95. (Previously Presented) The method of claim 94, wherein the information bits further include tail bits, and a pattern to puncture coded bit groups corresponding to coded bits of tail bits is '1011' for P_0 and '1011' for P_1 .

96. (Currently Amended) The method of claim 91, wherein the information bits include data bits, and a pattern used to puncture the coded bit group 'i' for ~~a~~ the adapted code rate of 1/5 turbo code rate when $4I < N \leq 5I$ is given by $P_{(i \bmod 2)}$, wherein 'i' is an index of the coded bit groups and ranges from 0 to I-1, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data information bits is '11101' for P_0 and '11011' for P_1 , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit coded bit group 'i'.

97. (Previously Presented) The method of claim 96, wherein the information bits further include tail bits and a pattern to puncture coded bit groups corresponding to coded bits of tail bits is '11011' for P_0 and '11011' for P_1 .

98. (New) The method of claim 43, wherein the prescribed data rate is a flexible data rate or a variable data rate.

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99. (New) The device of claim 56, wherein the prescribed data rate is a flexible data rate or a variable data rate.

100. (New) The method of claim 43, wherein the encoder is a turbo encoder.

101. (New) The method of claim 43, wherein the adapted code rate of the encoder is one of $1/3$, $1/4$, and $1/5$.

102. (New) The device of claim 56, wherein the encoder is a turbo encoder.

103. (New) The device of claim 56, wherein the adapted code rate of the encoder is one of $1/3$, $1/4$, and $1/5$.